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(54) **AN APPARATUS FOR OPENING AND CLOSING PACKAGES**

VORRICHTUNG ZUM ÖFFNEN UND SCHLIESSEN VON PACKUNGEN
APPAREIL SERVANT A OUVRIR ET FERMER DES EMBALLAGES

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- (73) Proprietor: **Pronova Aktiebolag
302 41 Halmstad (SE)**
- (72) Inventors:
• **JOSTLER, Jan
S-302 72 Halmstad (SE)**
- **BROD N, Ingemar
S-302 56 Halmstad (SE)**
- (74) Representative: **Karlsson, Leif Karl Gunnar
L.A. Groth & Co i Malmö HB,
P.O. Box 6153
200 11 Malmö (SE)**
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Description

[0001] The present invention relates to an apparatus for opening and closing packaging blanks (pockets) disposed in sequence after one another in a web, according to the preamble of the independent claim.

[0002] There is a need in the art for an apparatus for opening packaging blanks disposed in a web in sequence after one another in order to supply contents to the packaging blanks and to close them after the filling.

[0003] Patent specification EP-A-0 958 193 belonging to the family of WO-A- 0 958 193 describes a web comprising packaging blanks disposed in sequence after one another and an apparatus for opening and closing the packaging blanks. The web has longitudinal first and second edges and a first wall opposing a second wall. Transverse slots are provided between the side closures of the packaging blanks. Each respective wall is provided, along the above-mentioned second edge, with retainer means for co-operation with mechanical devices, which guide edge portions of the web when this is moved along mechanical devices. In each packaging blank, each one of the walls is provided with a longitudinal slot, the slot of the first wall departing from a transverse slot at the one side closure of the packaging blank and the slot of the second wall departing from a transverse slot at the second side closure of the packaging blank.

[0004] The apparatus includes those mechanical devices which are disposed in spaced apart relationship from one another in that part of the apparatus where the packaging blanks are moved opened and are disposed adjacent one another where the packaging blanks are moved closed.

[0005] The apparatus shown in EP-A-0 958 193 employs mechanical guide means, which displace the edge portions of the web in relation to one another in a longitudinal direction of the web in order to open and close the packaging blanks. The technique illustrated in said patent specification entails that there is required a certain adaptation between the dimensions of the mechanical guide means and the extent of the blanks in the longitudinal direction of the web in order that the desired opening and closing of the blanks may take place without problems occurring. This requirement on adaptation of the dimensions entails that the mechanical guide means must, as a rule, be replaced by other guide means of other dimensions before the apparatus can be employed for a web with blanks of a different size in the longitudinal direction of the web.

[0006] It is therefore obvious that there is a need in the art for a technique which does not require such adaptation.

[0007] There is also a need to be able to simply adapt the configuration of the openings of the opened packaging blanks depending upon the requirements which are placed by the contents which are to be supplied to the packaging blanks.

[0008] The present invention relates to an apparatus

for opening and closing packaging blanks included in a web, where the above-outlined drawbacks have been obviated and the above-disclosed needs/wishes have been satisfied. This is attained by the technique which is disclosed by the characterising clauses of the independent claim 1.

[0009] The subclaims relate to expedient embodiments of the present invention.

[0010] The present invention will be described in greater detail hereinbelow with reference to a number of figures, in which:

Fig. 1 is a side view of a portion of a web, according to the present invention, with retainer means of the web designed as material thickened portions;

Fig. 1a shows a section a-a in Fig. 1;

Fig. 1b shows a section b-b in Fig. 1;

Fig. 1c shows a section c-c in Fig. 1;

Fig. 2 shows a side elevation view of a portion of the web, according to Fig. 1, with walls of the web abutting against each other;

Fig. 2a-c show the sections a-a, b-b and c-c in Fig. 2;

Fig. 3a shows a section, corresponding to the section b-b in Fig. 1, with a different (second) design of the retainer related thickened portions of said web;

Fig. 3b shows a section, corresponding to the section b-b in Fig. 1, with a third retainer means disposed along said web;

Fig. 3c shows a section, corresponding to the section b-b of Fig. 1, with an inwardly folded bottom of the web;

Fig. 4 shows a schematic perspective view of a filling device and a web located adjacent the filling device;

Fig. 4a shows the section a-a in Fig. 4;

Fig. 4b shows the section b-b in Fig. 4;

Fig. 5 shows in a perspective view one embodiment of a filling device and the web, according to Fig. 1;

Fig. 6 shows in a perspective view a guide chain, including a mechanical guide member;

Fig. 6a shows a magnified detailed view of the guide chain illustrated in Fig. 6;

Fig. 6b shows a cross section through a linkage of the guide chain illustrated in Fig. 6;

Fig. 7 shows in a perspective view a chain-like device, including a mechanical guide member;

Fig. 7a shows a magnified detailed view of the chain-like device illustrated in Fig. 7;

Fig. 7b shows in a perspective view a linkage of the chain-like device illustrated in Fig. 7;

Fig. 7c shows a detailed view of a linkage of the guide chain illustrated in Fig. 7;

Fig. 8, 8a show in a perspective view a row of mechanical retainer means, in one embodiment of a mechanical guide member; and

Fig. 8b shows a side elevation view of a linkage of the mechanical guide member according to Fig. 8.

DESCRIPTION OVER PREFERRED EMBODIMENTS.

[0011] Figs. 1 - 3 show embodiments of a continuous web 20 of a flexible material, as a rule plastic material or similar material.

[0012] The term "similar material" is taken to signify any material whatever of such properties that a web of the material is suitable to be employed in the application of the invention described herein.

[0013] The web displays two opposing walls 21a,21b, hereinafter also referred to as a first wall 21a and a second wall 21b and a first (lower) and a second (upper) edges 22, 23, respectively located in the longitudinal direction of the web.

[0014] The web further including a number of packaging blanks 26 or pockets disposed in sequence after one another. The blanks each have a bottom portion 15 adjacent the above mentioned lower edge 22 and two connection zones or joints 25a,25b, transversely directed in relation to the longitudinal direction of the web and occasionally referred to as transverse zones 25a,25b or transverse joints.

[0015] In the figures, the web is generally shown in the embodiments where the opposing walls 21a,21b directly merge into one another in that the walls are double-folded in the bottom portions 15 of the blanks in order to form said bottom.

[0016] It will be obvious that, in other embodiments, both walls of the blanks form, as illustrated in Fig. 3c, an inwardly folded bottom in order to widen it, or are connected to one another, for example by a weld joint, which also forms the lower edge 22 of the web. Between the joints of two adjacent pockets one given the reference numeral 26, there is a transverse slot 27, which defines or separates the blanks from one another.

[0017] Each respective wall 21a,21b includes two opposing edge portions one given the reference numeral 24a, which extend in the longitudinal direction of the web at its above mentioned upper edge 23. Each one of the edge portions includes a continuous retainer means 13a, 13b; 43a,43b, hereinafter generally designated as the retainer means 13a,13b; 43a,43b of the edge portion.

[0018] The retainer means 13a,13b; 43a,43b of the edge portions co-operate with mechanical retainer means 33a,33b (cf. Fig. 4a and 4b) for guiding the edge portions 24a,24b on displacement of the web 20 into a device 3, for supplying contents to the blanks 26.

[0019] In the embodiments illustrated in Figs. 1, 1b, 1c, 2, 2a-c and 3a-c, the retainer means of the edge portions are designed as thickened material portions 13a, 13b; 43a,43b, while in other embodiments they may be designed as tunnels. The mechanical retainer means are in such instance designed so as to be located inside the tunnels when the web passes through the filler device 3.

[0020] Figs. 3a, and 3b show one embodiment of the material thickened portions of the web where the material thickened portion 43a of the one wall 21a is provided with a groove 72, oriented in the longitudinal direction of the

web, and the material thickened portion 43b of the second wall 21b is provided with a bead 71, oriented in the longitudinal direction of the web. The bead and the groove form a male and female part which fit tightly in one another and are preferably of a form which realises a snap connection. Figs. 3a, and 3b also show an embodiment where the web is provided with belt-like wall portions 14a, 14b above the thickened portions 43a,43b.

[0021] Fig. 3b also shows an embodiment of the web where a second retainer means 44 is disposed in the region of the first edge 22 of the web. The second retainer means 44 is principally intended to be employed for retaining the package formed from the packaging blank in connection with its emptying.

[0022] Fig. 3c shows one embodiment where the bottom portions 15 of the blank form an inwardly folded fold (bottom fold) 12 directed towards the openings of the blanks.

[0023] In its end region located most proximal to the retainer means 13a,13b; 43a,43b, the transverse slot 27 merges in a longitudinal slot 29a in the first wall 21a directed to the right in the figures and in the second wall 21b in a longitudinal slot 29b directed to the left. The longitudinal slots are located under the retainer means 13a,13b; 43a,43b of the edge portions.

[0024] Reference numerals 28a, and 28b relate to those material portions of the web in which the opposing walls of the web are connected to one another for closing the filled packaging blanks, e.g. by welded joints.

[0025] In certain applications, the connection of the walls takes place in a region beneath the slots 29a,29b, while in other applications the fusion together takes place in a region of the slots 29a,29b. On fusion of the slots, a satisfactory and tight connection is obtained because of the fact that, at each slot, the wall, which is opposed to the slot, is whole (lacks a slot). A satisfactory and tight fusion together takes place close to the second (upper) edge of the web, whereby material consumption for each blank which is filled and closed is reduced to a minimum.

[0026] Figs. 4 - 5 show one embodiment of a filling device 3 (Fig. 4) in which a web is displaced in the direction of an arrow "A" along the mechanical retainer means 33 of the filler device. Fig. 4 shows how the pockets or blanks of the web are opened and closed when the web passes through the filler station 3. It will be apparent from Fig. 4 that mechanical guide members 35, 36 are provided for leading (guiding) the opposing walls of the web from each other in order to open the pockets or blanks and then guide back the walls to a position adjacent one another, for closing the opened pockets or blanks once the contents has been supplied. The guide members are shown in simplified form in figure 4.

[0027] Fig. 4a shows a packaging blank (or pocket) 26 which is suspended in mechanical retainer means 33 with a channel 31 in which the retainer means 13a,13b of the edge portion of the web are located. The lower side of the channel is provided with a gap 34 with a gap width which prevents the retainer means 33 of the edge portion

from passing but which permits both walls of the web to pass. The pocket 26 is shown in an unopened state.

[0028] In Fig. 4b, the pocket 26 is opened and the retainer means of each respective edge portion are inserted in separate channels 31a,31b of mechanical retainer means 33a,33b which are located in spaced apart relationship from each other. Each respective wall 21a,21b of the web passes through a gap 34 in the lower region of the mechanical retainer means. The gap has a gap width which prevents the retainer means of the edge portion from passing. As a rule, the mechanical means are oriented such that the web depends down through the gaps 34 of the mechanical means 33 during movement along them. Another orientation of the mechanical means and of the web is employed in other practical applications of the present invention.

[0029] Fig. 5 shows in a perspective view an apparatus including said first mechanical retainer means 33a and said second mechanical retainer means 33b. These means are disposed parallel with each other. In the illustrated embodiment, the second mechanical retainer means 33b is fixed to the frame of the apparatus, while the first mechanical retainer means 33a is moveable in relation to the second mechanical retainer means while retaining parallel orientation.

[0030] Fig. 5 shows one embodiment in which the first mechanical retainer means is provided with two arms 37 located in spaced apart relationship from one another and oriented substantially at right angles to the longitudinal directions of the means. The arms, each one orientated in their groove 38, which are disposed in means which are rigidly connected to the frame of the apparatus.

[0031] The arms are provided with fixing devices for locking the arms in set positions in the grooves. By movement of the arms, the distance between the mechanical retainer means is adjusted. As a rule, the arms are moveable in relation to said first mechanical retainer means 33a in order to modify the position of the first mechanical retainer means in the longitudinal direction of the apparatus in relation to the position of the second mechanical retainer means in the longitudinal direction of the apparatus. The arms are also provided with fixing devices for locking the positions of the arms on said first mechanical retainer means 33a.

[0032] It will be apparent from the figures that, on entry into the filling device 3, the mechanical guide means 35 guides the retainer means 13a, 43a of the edge portion of the first wall 21a of the web so as to travel a longer distance than the retainer means 13b, 43b of the edge portion of the second wall 21b of the web. At the same time, the retainer means of the edge portions are displaced away from one another to a greater distance which is determined by the distance between the mechanical retainer means 33a,33b, the pockets or blanks being opened.

[0033] The openings which are formed between the edges of the opening consist of rectangles, as a rule parallelograms. The angles which are formed between the

edges of the opening of each pocket or blank are determined by the distance between the mechanical retainer means of the filler device, the size of the longer distance which the edge portion had been moved and any possible displacement of the first mechanical retainer means 33a in relation to the second mechanical retainer means 33b in the longitudinal direction of the apparatus.

[0034] On exit from the filler device, the retainer means 13b, 43b of the edge portion of the second wall 21b is guided by the mechanical guide means 36 to travel a longer distance than the retainer means 13a, 43a of the edge portion of the first wall 21a of the web. The longer distance the retainer means 13a, 43a, 53a of the front wall 21a is displaced during the entry into the filler device is compensated for by the shorter distance which the retainer means of the front wall is displaced on exit. This implies that both walls 21a,21b of the web after exit of the web from the filler device assume the same relative positions in the longitudinal direction of the web as before entry into the filler device. As a result, the sought-for effect will be achieved that the opposing walls of the pockets or blanks, after exit from the filler device, assume positions where they are no longer displaced in relation to one another in the longitudinal direction of the web. As a result, on the displacement out of the filler device, the walls 21a,21b of the web 20 are moved to positions adjacent one another, i.e. to positions in which a reliable and unobjectionable closure of the pockets take or blanks place in that the walls 21a,21b are connected in the material portions 28a,28b.

[0035] It will be obvious that the size of the openings of the packaging blanks may readily be adapted to pertinent needs by displacement of the mechanical retainer means 33a,33b away or towards one another, the distance being adapted to the length of the longitudinal slits of the web and the configuration which it is desired that the openings of the packaging blanks will have on supply of the contents.

[0036] The alteration of the distance need not take place in one step but may be selected and adjusted to an optional value within the range in which the apparatus is dimensioned to operate.

[0037] The design of the mechanical guide means 35, 36 entails that the above desirable effects are attained since the length of the mechanical guide means is maintained unchanged on adjustment of the distance between the mechanical retainer means.

[0038] The relative displacement of the mechanical retainer means in the longitudinal direction of the apparatus also affords a possibility of influencing the configuration of the openings.

[0039] Figs. 6, 6a and 6b show a second embodiment of the mechanical guide means 35, 36 where they are included in guide chains 133 including mechanical retainer means 33 for the web, while Figs. 7, 7a-c show a third embodiment of the mechanical guide means 35, 36, where the mechanical guide means 35, 36 are included in a chain-like device 233. The chain-like device is pro-

vided with linkages 200 which are supported and united by a belt 201, which is rigid in a vertical direction but flexible in a horizontal direction and which passes along the entire length of the chain-like device through holes 202, which are provided in the linkages 200.

[0040] As will be apparent from Fig. 6a and Fig. 6b, the mechanical retainer means 33 of the guide chain have through-going holes 130, which are oriented in the longitudinal direction of the guide chain. A rope-like solid device of elastic material, e.g. rubber, passes through the holes throughout the entire length of the chain. The rope-like device directs the mechanical retainer devices so that, for each mechanical retainer device between two surrounding mechanical retainer devices, the channel 31 and the gap 34 disposed in the lower region of the retainer device are kept directed towards the channel 31 and the gap 34 of the two surrounding mechanical retainer devices. As a result, a reliable passage for the web 20 will be ensured with the packaging blanks also when the disposition of the guide chain is altered.

[0041] In a simple variation of the guide chain, according to Fig. 6, 6a, and 6b, the guide chain 133a is formed solely by the mechanical retainer means 33 and the rope-like device 131.

[0042] Figs. 8, 8a and Fig. 8b show one embodiment of the apparatus where the mechanical guide means 35, 36 are formed by a row 333 of mechanical retainer means 33 disposed with relative short spacing between one another. The retainer means are connected with one another by means of a relatively thin and flexible material portion 301. The distance between the retainer means, the dimensioning of the flexible material portion and the material in it are selected such that the row of retainer means may be bent in a horizontal direction but not bent in a vertical direction. As a result, the desired effect will be attained that the mechanical guide means 35, 36 are to be flexible in a first plane with an orientation which substantially corresponds to the plane through the mechanical retainer devices 33a,33b or in a plane substantially parallel with said first plane, and that the guide means are substantially inflexible in a plane at right angles to said first plane.

[0043] Figs. 8a and Fig. 8b illustrate the possibility of producing a row 333 of retainer means in two steps. In a first step, that part of the row which is shown in Fig. 8a is formed, and in a second step the remaining part is formed which, after the formation, is united with said first part. In an alternative manufacturing cycle, the remaining parts of each retainer means are formed as separate parts which, after the formation, one by one are fixed to the part illustrated in Fig. 8a.

[0044] A further advantage with the novel technique is that the embodiment of the filler device, illustrated in the figures, makes it possible to continuously adapt the distance between the straight edges and also continuously adapt the relative positions of the straight edges in the longitudinal direction of the apparatus. As a result, the apparatus is capable of opening and closing the pack-

aging blanks in the web when the length of the blanks in the longitudinal direction is very short and also when it is very long, and in addition the apparatus is adjustable to open and close all blanks of length within the range between the short and the long length. In other words, the design of the apparatus entails that it may be dimensioned so as to be able to open and close blanks of a web regardless of their size, and that only practical grounds determine the limits of the sizes of the blanks of the web which a special apparatus is to be able to open and close.

[0045] In the foregoing description, the designations of upper, lower, right, left, vertical, horizontal, etc. have occasionally been employed. These designations have merely been employed to facilitate the presentation of the invention. It will be obvious to a person skilled in the art that the described technique generally permits any optional orientation of the web in space.

[0046] The foregoing detailed description has referred to but a limited number of embodiments of the present invention, but it will be readily perceived by a person skilled in the art that the present invention encompasses a large number of embodiments without departing from the scope of the inventive concept defined in the appended claims.

Claims

1. An apparatus (3) for opening and closing packaging blanks provided with first, mechanical retainer means (33a,33b), where the mechanical retainer means (33a,33b) is disposed, on the displacement of a flexible web (20) along said first, mechanical retainer means, to guide second retainer means (13a,13b; 43a,43b; 53a,53b) disposed at the web, where the apparatus includes at least one part where the first mechanical retainer means (33a,33b) are disposed in spaced apart relationship from one another in order to keep said packaging blanks open, where the apparatus includes mechanical guide means (35,36) which guide the opposing edge portions (24a,24b) of the web (20) on their displacement to and from that part of the apparatus where the packaging blanks are displaced open, where said guide means (35) is disposed, in said part, to position said edge portions (24a,24b) of the web (20) displaced in relation to one another in a longitudinal direction of the web, and where said guide means (36) is disposed, on displacement of the edge portions (24a, 24b) to positions adjacent one another, to eliminate said displacement, **characterised in that** the mechanical guide means (35, 36) are flexible in a first plane through said first mechanical retainer means (33a,33b) or in a plane parallel with said first plane; and that said mechanical guide means (35,36) are substantially inflexible in a plane at right angles to said first plane.

2. An apparatus as claimed in claim 1, **characterised in that** said mechanical guide means (35, 36) are formed from a chain; and that the links of the chain are provided with passages through which the web is displaced.
3. An apparatus as claimed in claim 1, **characterised in that** the mechanical guide means (35, 36) are formed from a row of mechanical retainer means (133a) which are disposed in spaced apart relationship from one another; and that said retainer means are interconnected with one another by means of a rope-like solid device (131) of elastic material, e.g. rubber, which permits a certain flexibility of the device.
4. An apparatus as claimed in claim 3, **characterised in that** each mechanical retainer means (133a) is provided with abutment surfaces turned to face towards adjacent retainer means; and that abutment surfaces on two adjacent *[deletion(s)]* disposed retainer means in an unflexed guide means, are disposed in spaced apart relationship from one another which entails that the bending of the mechanical guide means (35, 36) in the plane at right angles to said first plane is restricted to a predetermined maximum flexing.
5. An apparatus as claimed in claim 1, **characterised in that** the mechanical guide means (35, 36) are formed from a row of mechanical retainer means (133b) which are disposed in spaced apart relationship from one another; and that said retainer means are interconnected with one another by means of a relatively thin belt, which permits said flexibility and said inflexibility.

Patentansprüche

1. Vorrichtung (3) zum Öffnen und Schließen von Verpackungszuschnitten, die mit ersten mechanischen Halteeinrichtungen (33a, 33b) versehen ist, die so angeordnet sind, dass sie beim Durchlauf einer flexiblen Bahn (20) entlang der ersten mechanischen Halteeinrichtungen an der Bahn befindliche zweite Halteeinrichtungen (13a, 13b; 43a, 43b; 53a, 53b) führen, wobei die Vorrichtung mindestens einen Teil, in dem die ersten mechanischen Halteeinrichtungen (33a, 33b) beabstandet voneinander liegen, um die Verpackungszuschnitte offen zu halten, und mechanische Führungseinrichtungen (35, 36) aufweist, die die gegenüber liegenden Kantenteile (24a, 24b) der Bahn (20) bei deren Lauf zu und aus dem Vorrichtungsteil führen, in dem die Verpackungszuschnitte sich offen bewegen, wobei weiterhin die Führungseinrichtung (35) im genannten Vorrichtungsteil so angeordnet ist, dass sie die Kantenteile (24a, 24b)

der Bahn (20) in Längsrichtung derselben voneinander beabstandet hält, und wobei die Führungseinrichtung (36) beim Durchlauf der Kantenteile (24a, 24b) beieinander liegende Positionen einnimmt, um die Beabstandung aufzuheben, **dadurch gekennzeichnet, dass** die mechanischen Führungseinrichtungen (35, 36) in einer durch die ersten mechanischen Halteeinrichtungen (33a, 33b) verlaufenden ersten Ebene oder in einer zu dieser ersten Ebene parallelen Ebene ausbiegbar sind, während die Führungseinrichtungen (35, 36) in einer zur ersten Ebene rechtwinkligen Ebene im wesentlichen nicht ausbiegbar sind.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die mechanischen Führungseinrichtungen (35, 36) aus einer Kette gebildet und die Glieder der Kette mit Durchlässen versehen sind, durch die hindurch die Bahn bewegt wird.
3. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die mechanischen Führungseinrichtungen (35, 36) aus einer Reihe mechanischer Halteeinrichtungen (133a) gebildet sind, die beabstandet voneinander liegen, und dass die Halteeinrichtungen durch eine seilartige massive Einrichtung (131) aus elastischem Werkstoff - bspw. Gummi - miteinander verbunden sind, die der Einrichtung eine gewisse Biegsamkeit erteilt.
4. Vorrichtung nach Anspruch 3, **dadurch gekennzeichnet, dass** jede mechanische Halteeinrichtung (133a) mit einer der angrenzenden Halteeinrichtung zugewandten Anschlagfläche versehen ist und dass die Anschlagflächen zweier aufeinander folgender, vorwärts laufender Halteeinrichtungen in einer nicht ausgebogenen Führungseinrichtung voneinander beabstandet liegen, so dass ein Ausbiegen der mechanischen Führungseinrichtungen (35,36) rechtwinklig zur ersten Ebene auf ein vorbestimmtes Ausmaß begrenzt ist.
5. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die mechanischen Führungseinrichtungen (35, 36) aus einer Folge mechanischer Halteeinrichtungen (133b) gebildet sind, die beabstandet voneinander liegen, und dass diese Halteeinrichtungen durch einen verhältnismäßig dünnen Riemen miteinander verbunden sind, der die Bieg- und die Unbiegsamkeit ermöglicht.

Revendications

1. Dispositif (3) pour ouvrir et fermer des découpes d'emballages, muni de premiers moyens mécaniques de retenue (33a, 33b), les moyens mécaniques de retenue (33a, 33b) étant disposés sur le passage

d'une bande souple (20) le long desdits premiers moyens mécaniques de retenue, pour guider des seconds moyens de retenue (13a, 13b ; 43a, 43b ; 53a, 53b) disposés au niveau de la bande, le dispositif comprenant au moins une partie où les premiers moyens mécaniques de retenue (33a, 33b) sont disposés de manière mutuellement espacées afin de maintenir ouvertes lesdites découpes d'emballages, le dispositif comprenant des moyens mécaniques de guidage (35, 36) qui guident les portions de bord opposées (24a, 24b) de la bande (20) lors de leurs mouvements de va-et-vient par rapport à la partie du dispositif où les découpes d'emballages sont déplacées en étant ouvertes, où lesdits moyens de guidage (35) sont disposés, dans ladite partie, pour provoquer un décalage desdites portions de bord (24a, 24b) de la bande (20) l'un par rapport à l'autre dans la direction longitudinale de la bande, et où lesdits moyens de guidage (36) sont disposés, sur le passage des portions de bord (24a, 24b), à des emplacements mutuellement adjacents, afin de supprimer ledit décalage, **caractérisé en ce que** les moyens mécaniques de guidage (35, 36) sont souples dans un premier plan passant par lesdits premiers moyens mécaniques de retenue (33a, 33b) ou dans un plan parallèle audit premier plan ; et **en ce que** lesdits moyens mécaniques de guidage (35, 36) sont sensiblement non souples dans un plan perpendiculaire audit premier plan.

2. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits moyens mécaniques de guidage (35, 36) sont constitués par une chaîne ; et **en ce que** les maillons de la chaîne sont pourvus de passages à travers lesquels passe la bande.
3. Dispositif selon la revendication 1, **caractérisé en ce que** les moyens mécaniques de guidage (35, 36) sont constitués par une rangée de moyens mécaniques de retenue (133a) qui sont disposés de manière mutuellement espacée ; et **en ce que** lesdits moyens de retenue sont reliés les uns aux autres par un dispositif massif (131) analogue à une corde en matière élastique, par exemple en caoutchouc, ce qui donne une certaine souplesse au dispositif.
4. Dispositif selon la revendication 3, **caractérisé en ce que** chaque moyen mécanique de retenue (133a) est pourvu de surfaces de butée tournées de manière à être orientées vers les moyens de retenue adjacents ; et **en ce que** des surfaces de butée, présentes sur deux moyens de retenue disposés de manière adjacente dans un moyen de guidage ne fléchissant pas, sont disposées de manière mutuellement espacée l'une de l'autre, ce qui a pour effet que la flexion des moyens mécaniques de guidage (35, 36) dans le plan, perpendiculairement audit premier plan, est limitée à une flexion maximale prédé-

terminée.

5. Dispositif selon la revendication 1, **caractérisé en ce que** les moyens mécaniques de guidage (35, 36) sont constitués par une rangée de moyens mécaniques de retenue (133b) qui sont disposés de manière mutuellement espacée ; et **en ce que** lesdits moyens de retenue sont reliés les uns aux autres par l'intermédiaire d'une courroie relativement mince, ce qui permet ladite souplesse et ladite absence de souplesse.

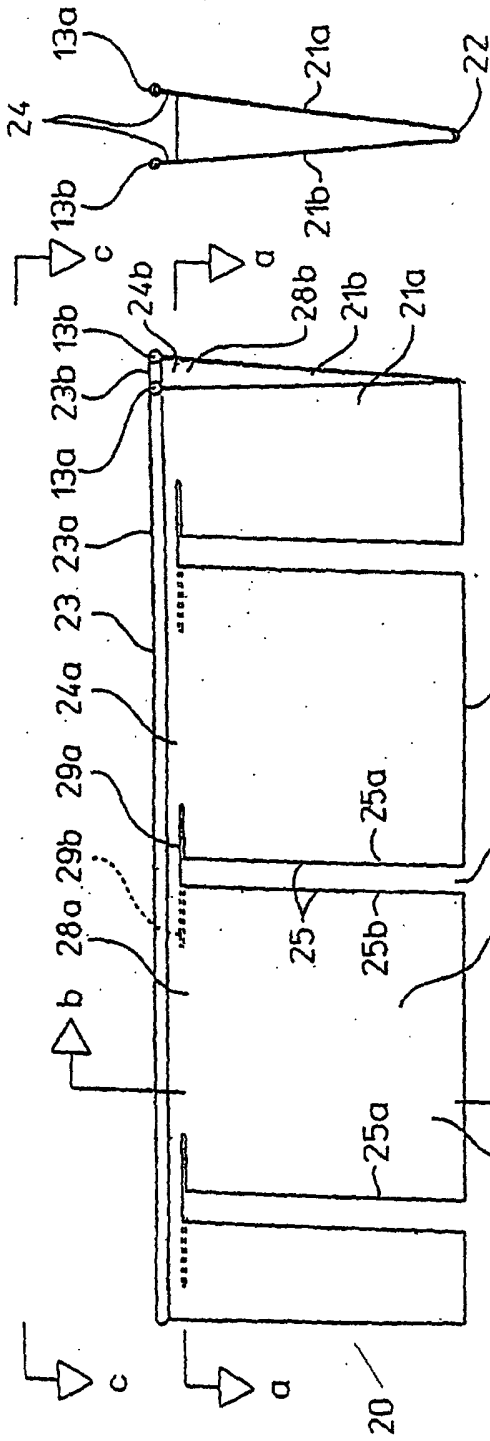


Fig. 1

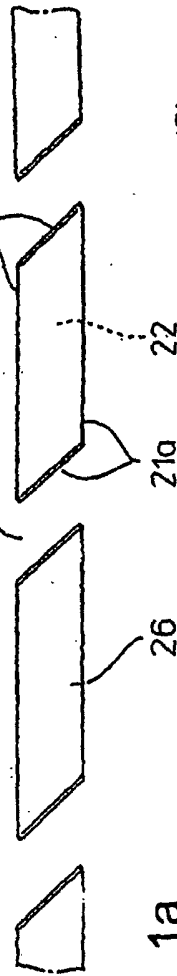


Fig. 1a

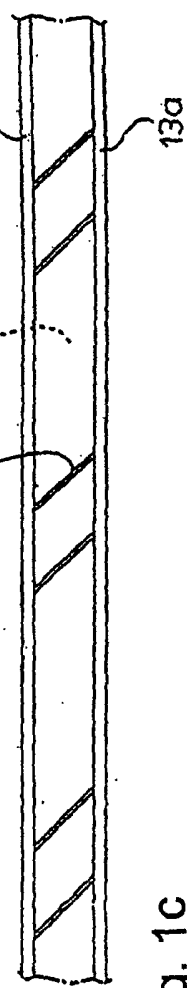


Fig. 1c

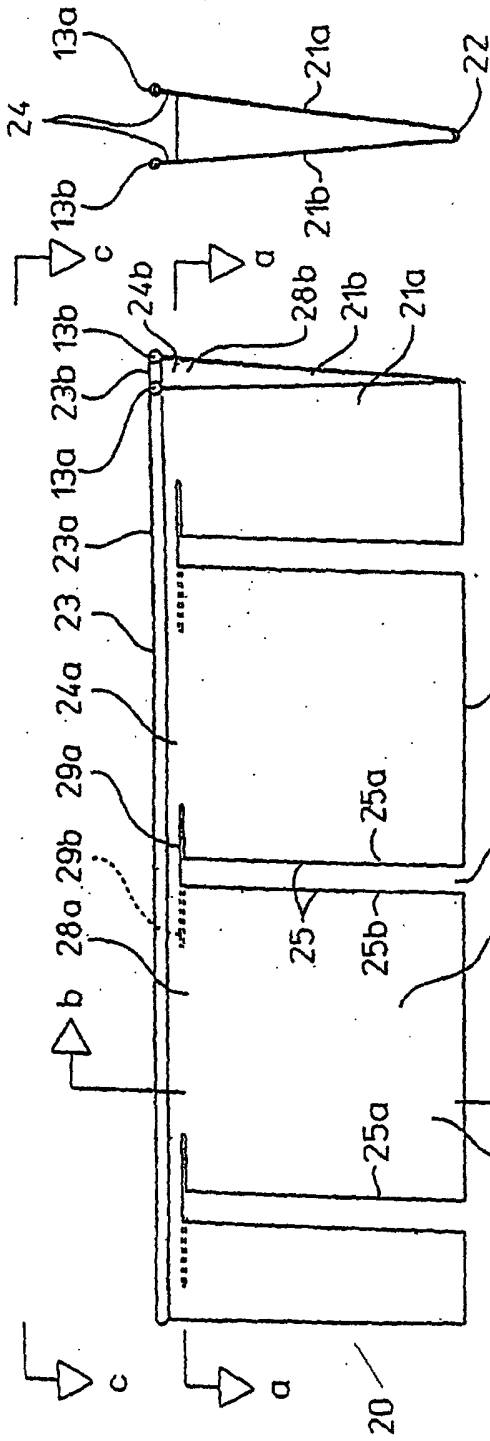


Fig. 1b

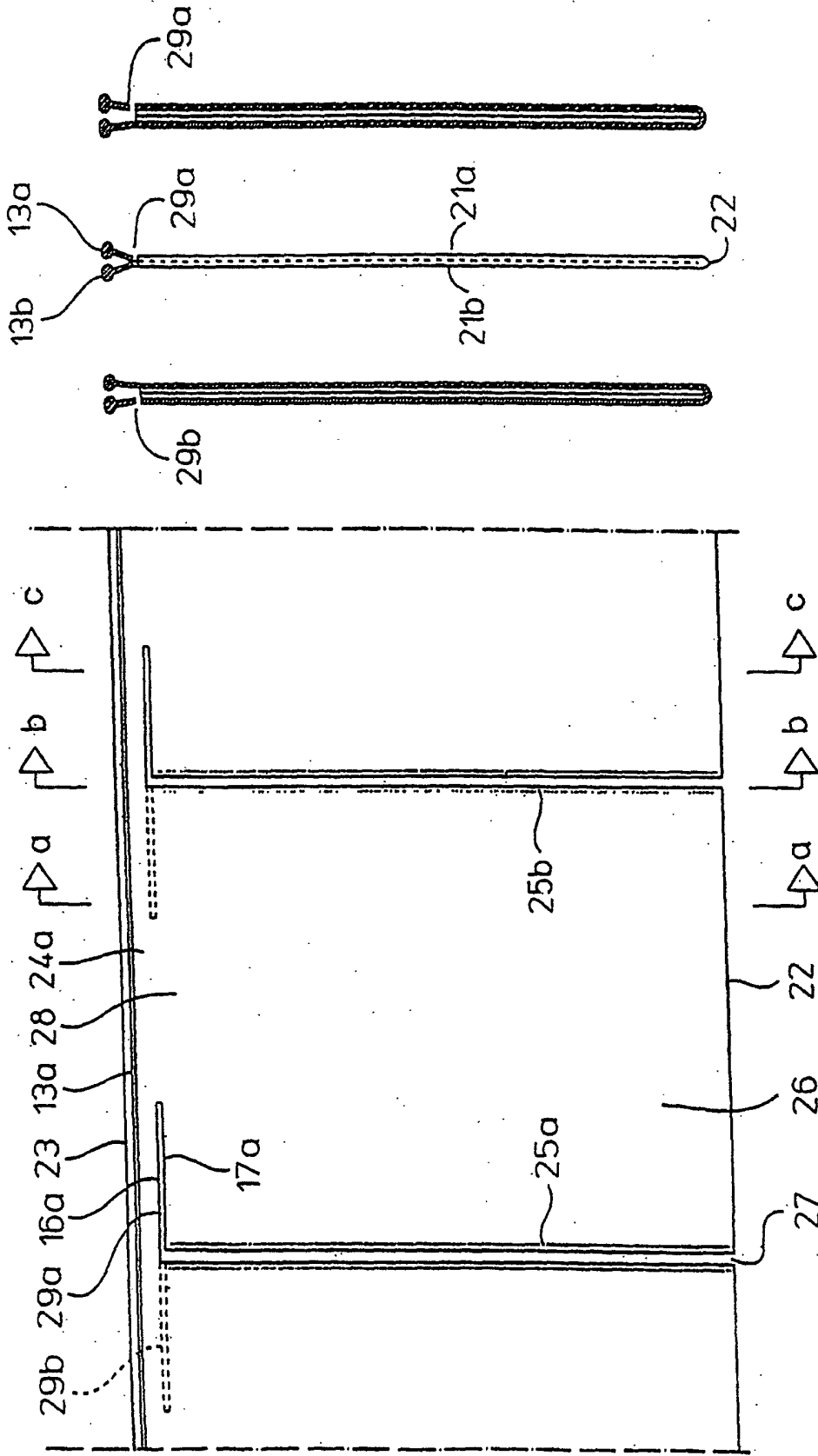


Fig. 2a Fig. 2b Fig. 2c

Fig. 2

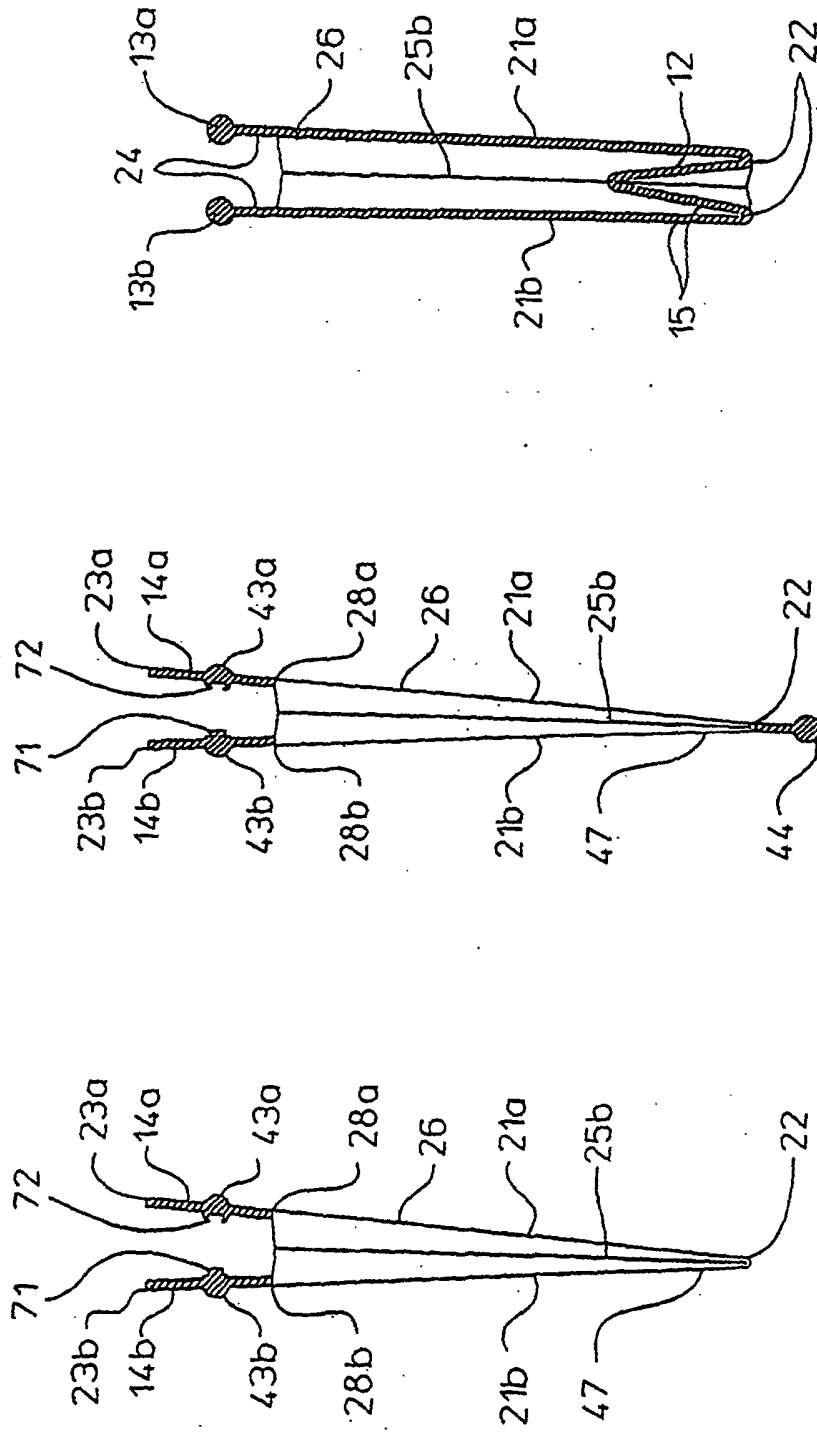


Fig. 3c

Fig. 3b

Fig. 3a

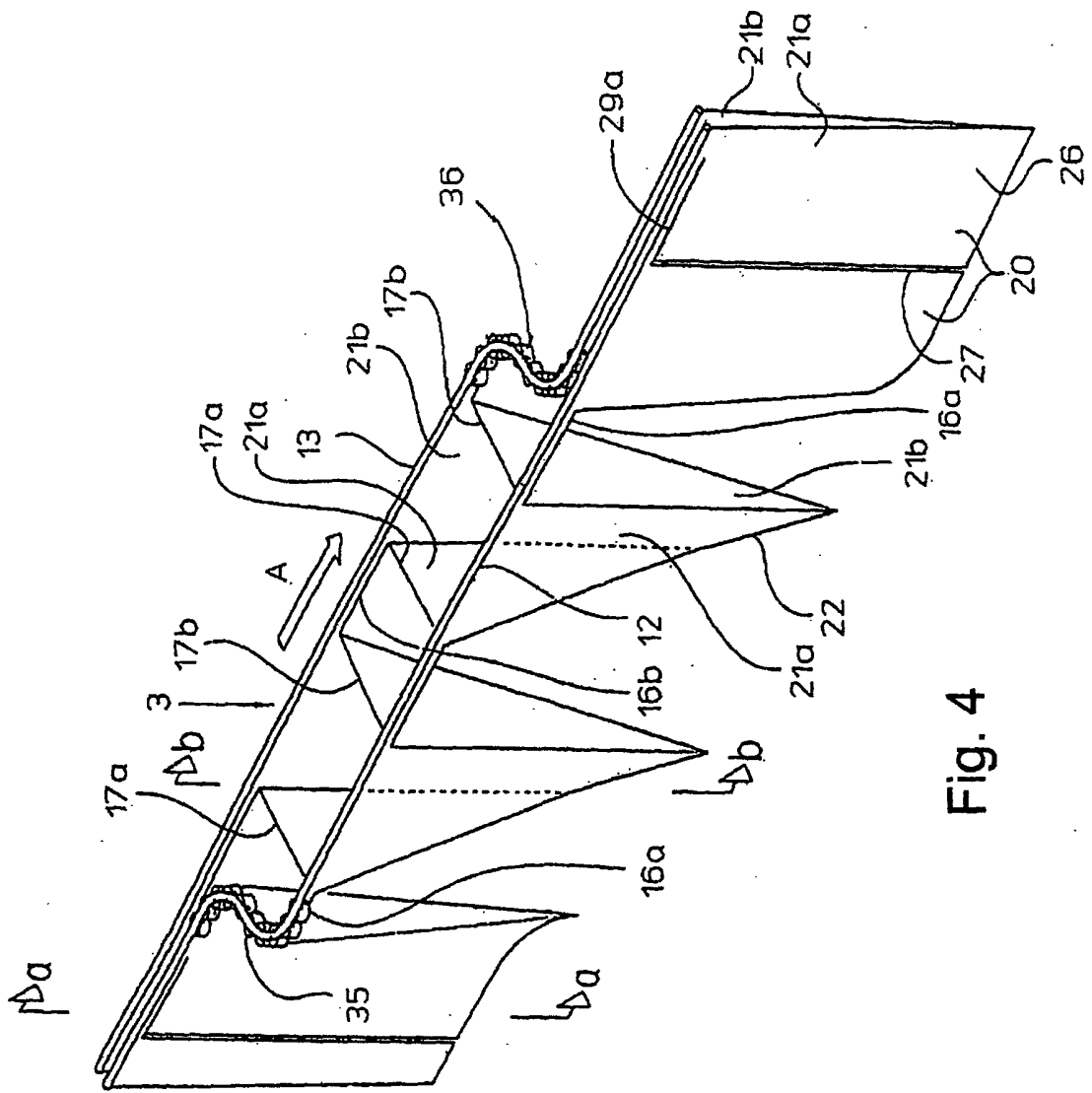


Fig. 4

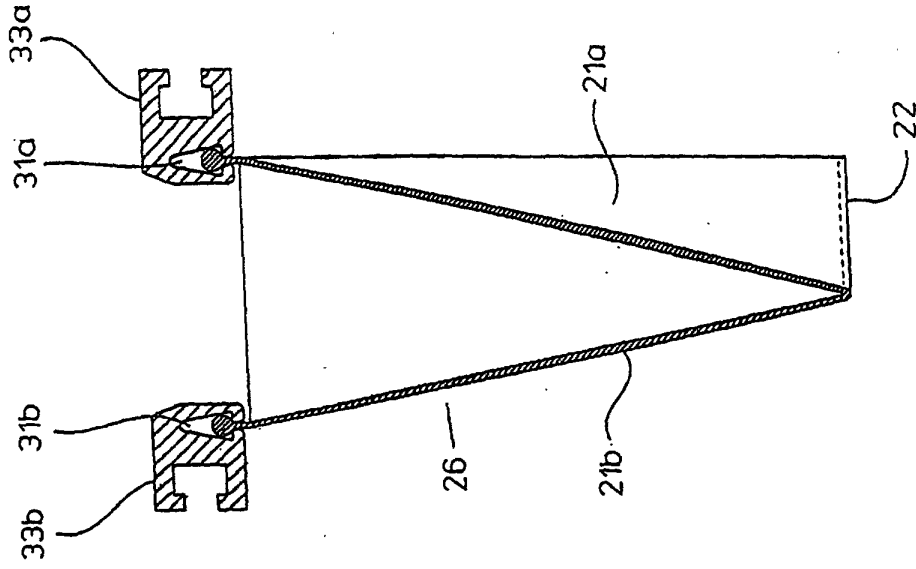


Fig. 4b

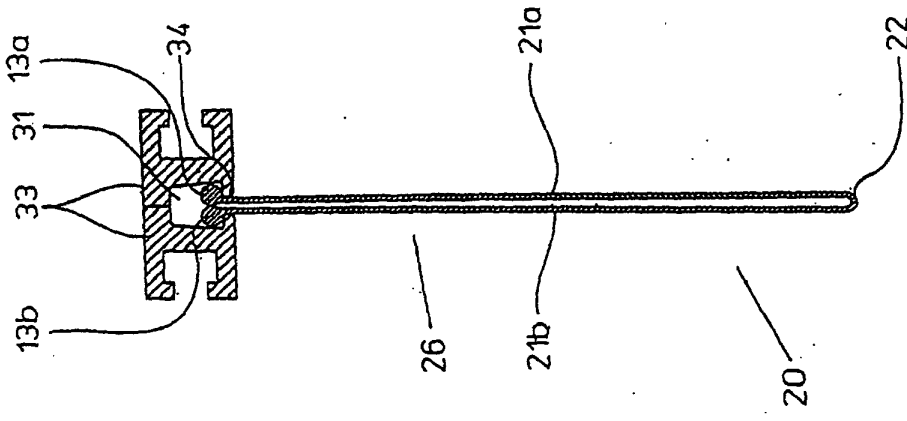


Fig. 4a

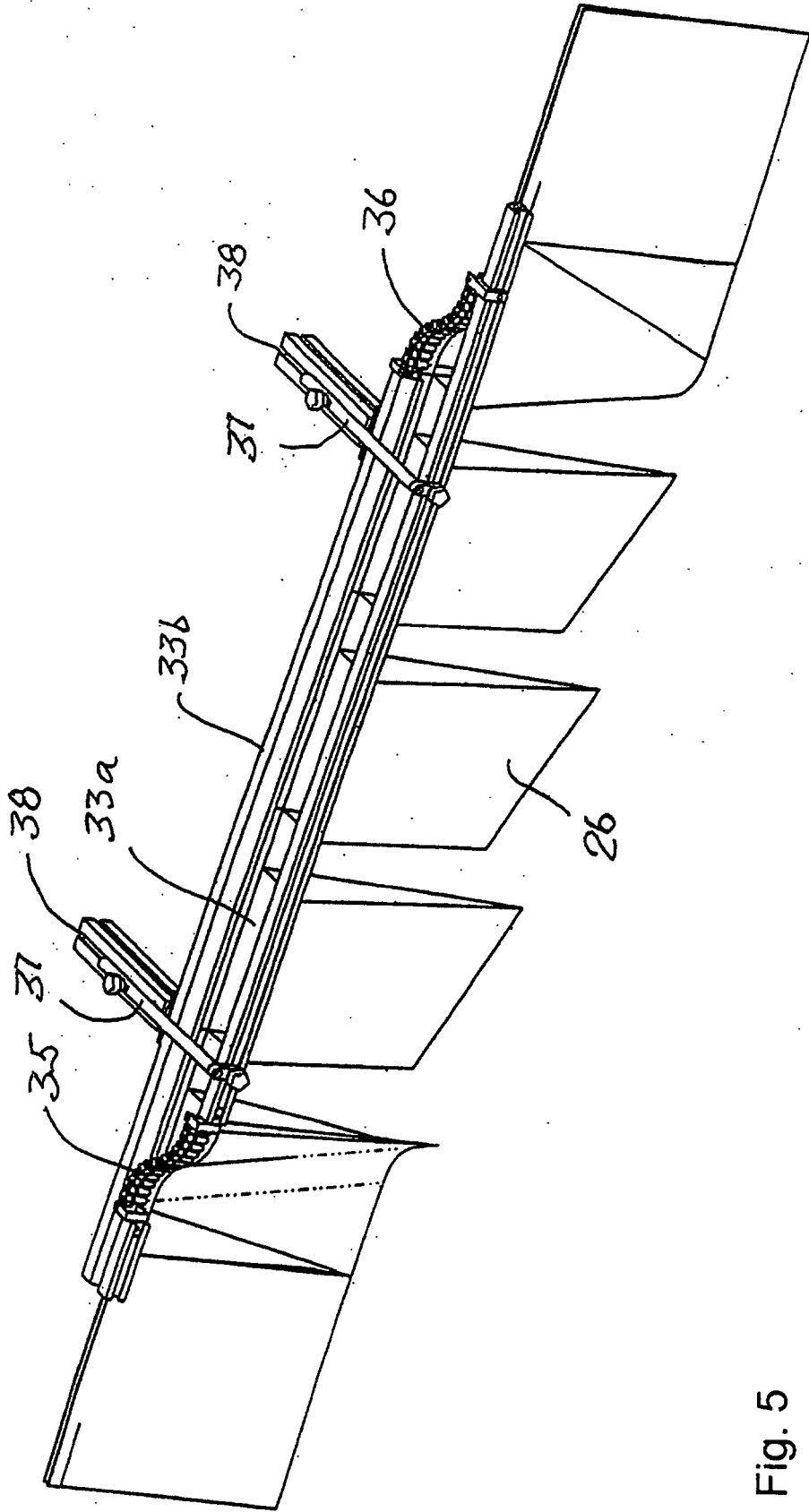
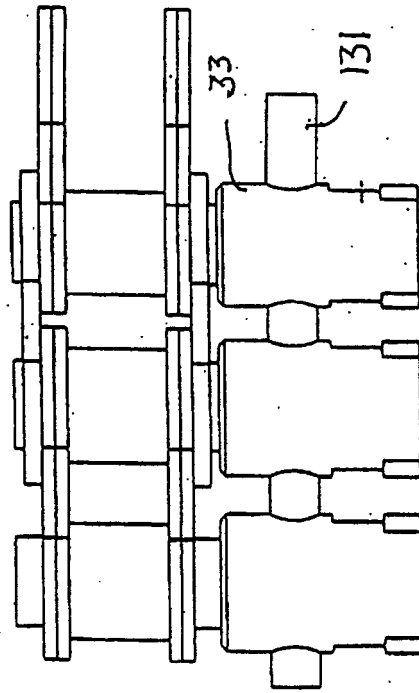
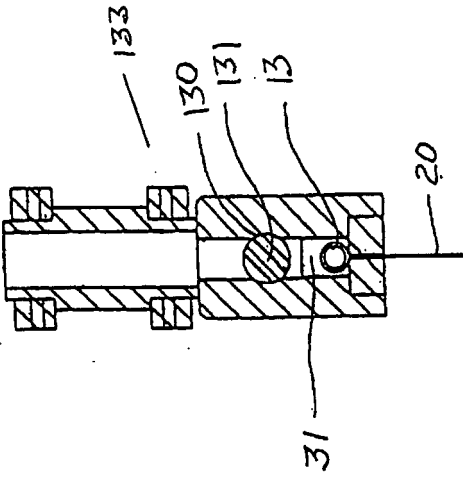
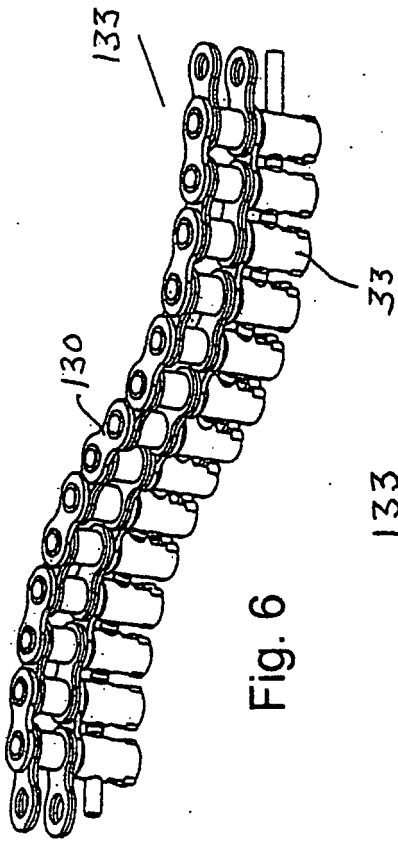


Fig. 5



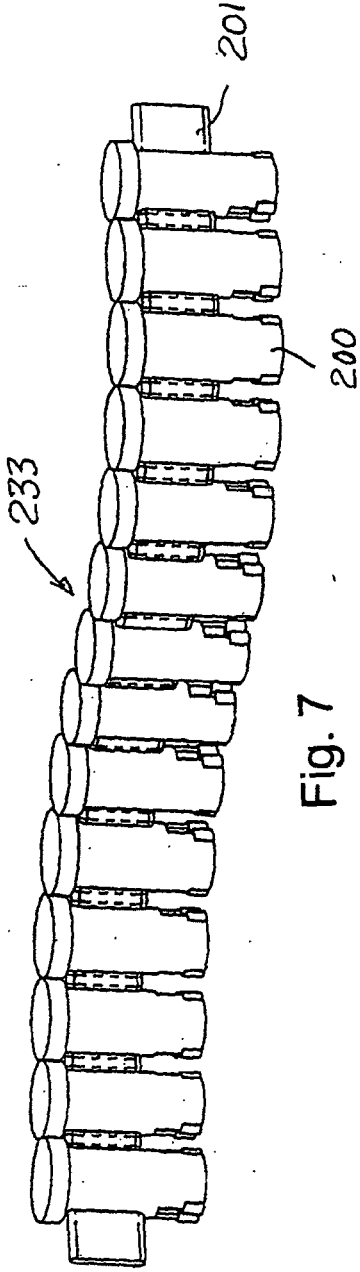


Fig. 7

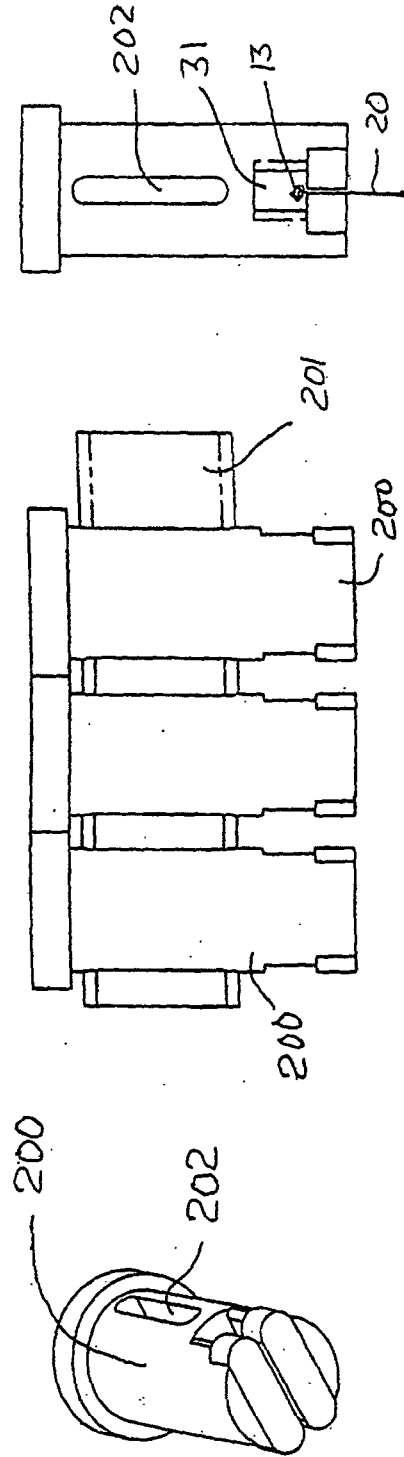


Fig. 7a

Fig. 7c

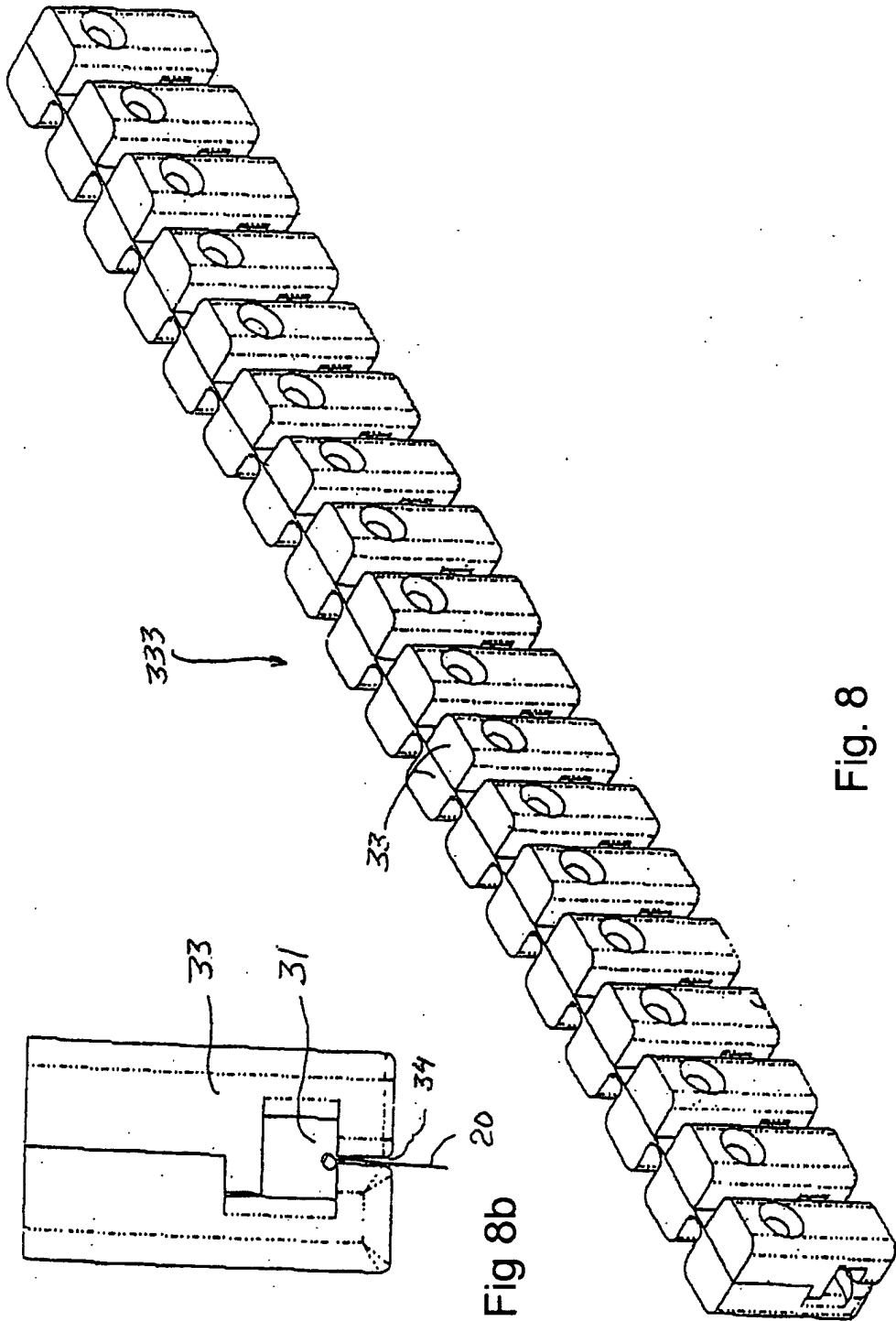


Fig. 8

Fig 8b

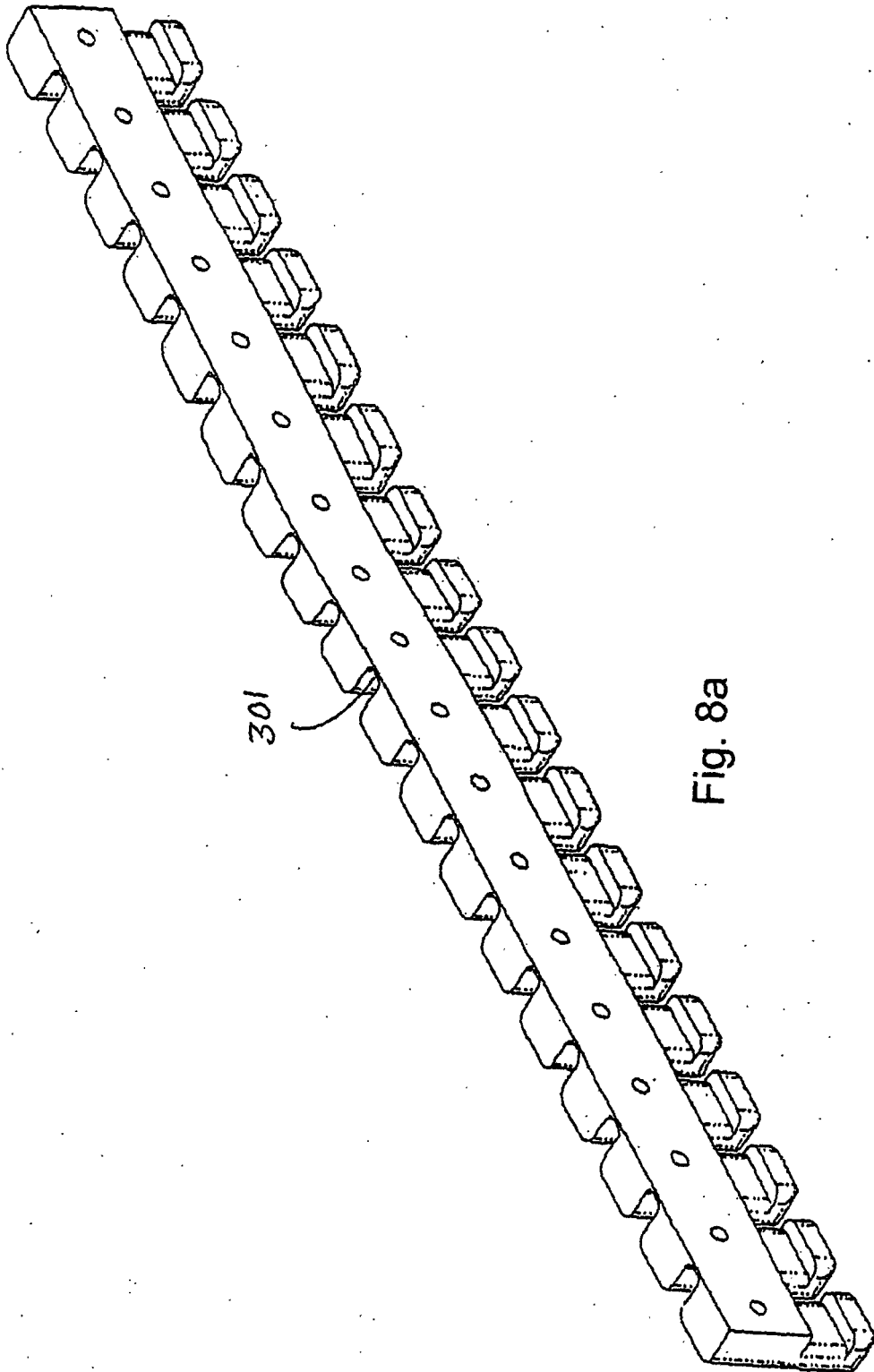


Fig. 8a